

THE AUK:

A QUARTERLY JOURNAL OF
ORNITHOLOGY.

VOL. XXV.

JANUARY, 1908.

No. 1.

A LONG-DRAWN-OUT MIGRATION: ITS CAUSES AND CONSEQUENCES.

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THE migration of birds in the spring of 1907 at Ottawa, Ontario, and vicinity, was a remarkable one from several points of view. And in the hope of being able to help to shed a little light on this fascinating and at the same time mysterious natural phenomenon of bird migration, and to stimulate others to better efforts in this direction, this present article is written.

It was a long-drawn-out migration. The first migrant here, *Otocoris alpestris praticola*, came February 10, in small numbers to the Dominion rifle range near here, where 1800 sheep had been pastured in the open all winter. The last transient migrant observed by the writer was a Black-poll Warbler, June 12. Usually the former comes here, or rather is seen, about February 20, and the latter leaves the first two or three days in June. Anyone will admit that from February 10 to June 12 is quite a long migration period for almost anywhere in the northern hemisphere. But it is not so much the greater length of time, but rather the anomalies occurring *within* the time specified above, that made the last migration here seem a long-drawn-out one. After the arrival of the first two comers from the south, the Prairie Horned Lark and the Crow, the latter arriving about the last week of February or the first of March, there is usually a lull in the migration until March 20-24; when the second batch of migrants puts in an appearance in the shape of the Song Sparrows, Robins, Bluebirds, Red-winged Blackbirds, Bronzed Grackles, Juncos, Purple Finches and Cedar-birds. There seems to be a keen rivalry between some of these

hardy pioneers into the wintry conditions then still prevailing here, for some years the one, other years the other will be first. This year, however, some of these birds came very considerably earlier than this. The cheerful Song Sparrow came March 13, as compared with April 2 of the preceding year, and March 18 of 1905; the Robin respectively, March 16, March 31, March 19; the Bluebird, March 21, April 3, March 24; the Bronzed Grackle, March 23, April 2, March 27; the Red-winged Blackbird, March 23, April 2, March 24. At the same time there was nothing discernible here and in this whole part of Canada, that could be supposed to have induced any birds to come earlier. In February we had had severe winter weather, more so than is usual in that month, and March did not show much letting-up of this. The explanation the writer arrived at, is the following: For several days before the arrival of the Song Sparrow and the others given above, there had been a spell of phenomenally warm weather to the south of us, in the latitude of New York, Washington, Chicago, St. Louis, etc. For many years no such warm weather had been recorded at New York and Washington. This must have had the effect of attracting more hosts of migrants into this latitude, than would have been the case under normal conditions. This in turn must have uncomfortably crowded the bird population already there and made the food supply, not too abundant at that time of the year, rather scarce. These two conditions, or either one alone, would, to my mind, have the effect of urging the hardiest of the birds there, those that would have turned northward first at any rate, even if normally some days later, to do so several days earlier than they would otherwise have done, and thus we had the strange spectacle of seeing and hearing Song Sparrows, Robins, etc., when there were real winter conditions here, much snow, ice, and cold. But right here several exceptions must be noted. The Purple Finch and the Cedar-bird, usually among the first of this batch of migrants, came this year not only not earlier, but very much later than usually. The former came only April 27 and then not nearly in its usual abundance, and the latter even not before June 7, but then as abundant as ever.

Then arrived the usual next-comers, the Tree Swallow, Meadow-lark, Flicker, several of the ducks, the Killdeer, the Phœbe, Marsh

Hawk; in April the Kingfisher, the Savanna and White-throated Sparrows, the Hermit Thrush, etc. But these came in lesser numbers, at greater intervals, less noticeably, than in other years. Then came a standstill, a lull in the migration, and that was prolonged, painfully and ominously prolonged, far into May. The usual April weather gave way to colder weather again, and instead of this being vanquished by May, it only became more pronounced. On May 4 there was an uproarious snowstorm, leaving six inches of snow, some of which remained till the 7th. And the cold weather stayed with us throughout May; now and then there were light snow flurries, as on the 28th, which appeared like a typical raw, blustering April day. Nor were we, in this part of Canada, the only sufferers from these untoward weather conditions; they extended over half of northeastern America. In Washington it was the coldest May for 36 years, and during a trip the writer had occasion to make in the middle of May, he found the same conditions as here, at Detroit, Ft. Wayne, Ind., and nearly as bad at St. Louis, where the unusual spectacle could be had of seeing people in furs and overcoats in the middle of May. As a consequence vegetable life remained at a standstill practically for four to five weeks. The leaf buds on the trees did not open, the trees were bare here throughout May, or very nearly so.

The effect of all this on the migration of birds was simply disastrous. It not only delayed most species considerably, but it scattered their bands, it decreased their numbers and caused a deplorable mortality among certain species.—First, as to the delayment in the coming of many species. From the appended comparative list can be seen, that after April 28 till May 9, there was only one new species recorded, the Whippoorwill, whereas in a chronologically arranged list of the foregoing year there are 23 species recorded within the same time! Then compare the time of arrival of the following birds this year, with that of last. Chimney Swift, 1907, May 10; 1906, April 30. House Wren, May 9, May 2. Spotted Sandpiper, May 19, May 2. Black and White Warbler, May 10, May 4. Yellow Warbler, May 13, May 4. Bobolink, May 18, May 5. Black-throated Green Warbler, May 16, May 7. Parula Warbler, May 15, May 7. Least Flycatcher, May 15, May 11. Hummingbird, May 30, May 15. Wood Pewee, May 31, May 17.

Black-poll Warbler, May 31, May 21. This shows a delayment of from four to seventeen days, or an average of $10\frac{1}{2}$ days for the twelve species. Again, whereas the annual great migratory waves of birds, especially warblers, thrushes and flycatchers, are seen in the gardens along our city limits about May 20–23, this year they were only seen on May 29. But there are exceptions to be noted here also. Last year's first record for the Scarlet Tanager, *e. g.*, was May 17, this year's, May 15; Myrtle Warbler, April 28, May 2. The Nighthawk, which must have had a hard time to find its winged prey, as moths, flies and mosquitos, which were few and far between in May, came on its usual date, May 16.

That the bands of migrants were badly scattered and reduced in number by the cold weather, or rather the lack of food resulting therefrom, cannot be doubted. For instance, during the presence of the Black-poll Warbler here, one can hardly ever be outside of the reach of their voice anywhere in the city — Ottawa is famous for its many large shade-trees along the streets — or in the surroundings, whereas this year I heard only three or four. Normally the Bay-breasted Warbler, together with *Dendroica striata*, the last migrants to arrive here, can be seen by dozens, yes, by hundreds in its favored pine woods, whereas this year they were nearly absent, except for a few hours in a few favored but restricted localities. Similar statements could be made concerning the Cape May Warbler, the Warbling Vireo, the Barn Swallow, etc.; even the Tree Sparrow, Brown Creeper, and Rusty Grackle were hardly in evidence, and the Chimney Swift does not seem to have attained its usual superabundance. Certainly, people that happened to encounter one of the few late larger bird waves, or who noticed the warblers better on account of the missing foliage on the trees in May, will say, I never saw so many birds as this year, or so many warblers, but I am convinced the numbers of many species were less this summer than other years. Perhaps some of the comers, finding conditions so uncongenial here, retraced their way to the south again for some distance. That this was done by the Tree Swallow, at least, I have no doubt, a large flock of which I saw over the Rideau River on March 30, after which none were to be seen again for about two weeks. But here, too, there are exceptions to be recorded. The Ruby-crowned Kinglet seemed to be just as

abundant and jolly as ever, even more so; the Olive-backed Thrush was much commoner than usual; the Spotted Sandpiper I never saw in such abundance anywhere as here in June; and on May 19 the *Dendroica caerulescens*, usually not very numerous even in migration, was so abundant at Dow's Swamp, that its numbers equalled those of all other birds combined.

That the untowardliness of the weather and food conditions not only delayed many species in coming, but made them postpone their departure also, in the case of transient migrants, need not be surprising. Thus, as late as June 7, Tennessee Warblers, Pine Siskins and Olive-backed Thrushes could be heard singing lustily in Major's Hill Park in the center of Ottawa. Of these the Siskins, and Olive-backed Thrushes *probably* breed here in a few scattered instances, but the bulk of them usually retire northward before that time. On the other hand, the Rusty Grackles, Tree Sparrows, and to some extent the White-crowned Sparrows, having arrived later than commonly, did not stay so long as they would normally, but hurried on northward.

But the worst feature in this migration was the deplorable mortality brought about by the un-May-like weather of May. This was probably not so much due to the cold directly, as to the lack of food caused thereby. Vegetation remained at a standstill from end of April to nearly the end of May. The flower and leaf buds did not unfold. As a consequence the small insects, plant lice, etc., that otherwise are found there, were absent. Therefore the insect eaters, especially those living on small insects and lepidoptera, chief among which are the swallows and warblers, had to suffer most. It was a pitiable sight, and a very common one, to see the little warblers with ruffled feathers and half-extended wings, weakened by hunger, searching in the most unlikely places for a little food. On May 28, with snowflakes flying, I saw a Canadian Warbler (*Wilsonia canadensis*) and a Blackburnian Warbler searching for food among rubbish and tin-cans, not able to fly away. Many people, farmers, a lumberman having just returned from Lake Kippewa in the Algoma District, and others, in this and the neighboring counties, told the writer about the "tameness" of the pretty little "black and yellow" birds, that they had "never seen before," allowing one to almost or quite catch them in the hands,

right about the houses, etc. And many were found dead. Two Tree Swallows, one Brown Creeper, one Canadian, and several Blackburnian Warblers were brought to the writer, having been found dead. The last seem to have been the principal sufferers. Three of them were sent to me by a friend from Renfrew County, who had found them dead. Then a strange performance on the part of a Robin was noticed. A Myrtle Warbler was in its last agonies, on a bridge through a farmer's swamp land, when a Robin came and tried to carry it off. Why?

At High Falls, Labelle County, Quebec, 50 miles northeast of Ottawa, the same story could be heard. Many warblers were found dead along the Lièvre River, also at other places. On being questioned, quite a number of the children of a school there, reported having found from one to five dead birds, without having looked for them. Several were brought to the museum at Ottawa, etc. Now, it is safe to assume that for each dead bird found, a hundred or a thousand were not found, so the destruction of bird life, especially of warblers, must have been appalling.

Some curious changes in the habits of several species were also brought about by the unfavorable food and weather conditions. If a person had begun to study warblers in this vicinity this spring, he would have come to the conclusion that warblers were terrestrial or even water-loving birds. And he would have had the facts all in his favor, for a while at least. On May 20, during a walk of about a mile, I saw about 15 Yellow Warblers, all on or near the ground on old weed stalks, some never quitting the edge of pools of water. Later I noticed this many times of the *Mniotilta varia*, *D. Blackburnia* and *D. maculosa* and *Wilsonia canadensis*. Of the Cape May Warbler, a species rather common here about May 23, but found in spruce only in a few spots, I saw only one last May, and that in a dirty dog-pound! The Myrtle Warbler would certainly have been classed as a swamp bird pure and simple, for it could always be seen over open water in swamps, etc., perching on bushes or old cattails and darting after the few passing gnats and moths in true flycatcher style. The above-mentioned tameness, in most cases really weakness, will probably not be noticed again soon. On May 4, after that snowstorm, several Hermit Thrushes hopped on to the veranda of a house and up to within three feet of two persons standing inside the window, in plain view of the birds.

That the nesting of the birds, whose coming had been so delayed, was also somewhat postponed, is almost self-evident. In fact this was not only caused by lateness of arrival, but also by the lack of cover in trees and swamps. Thus the Robins and Redwings, having been here even earlier than usual, in many cases commenced nest building much later, waiting no doubt for the leaves to come out and the cattails to grow to screen their nests from view. Perhaps for the same reason more Robins put up their establishments on houses, under verandas, over doors and windows and like situations, than I have ever seen before.

The following list will serve to further illustrate some of the points made above. It is not by any means a complete list of all species to be recorded here. Birds like Redpolls, Crossbills, many ducks, hawks, etc., are omitted for apparent reasons. Some species, like the Brown Thrasher, the Olive-sided Flycatcher, the Black-billed Cuckoo, Osprey, etc., were not seen by me till June or July, after being installed in their breeding places for some time.

Dates of Arrival.

	1907	1906	1905
Prairie Horned Lark	Feb. 10	Feb. 20	Feb. 28
Crow	Mar. 2	Mar. 9	" 18
Song Sparrow	" 13	Apr. 2	Mar. 18
Robin	" 16	Mar. 31	" 19
Blue Heron	" 17	Apr. 5	—
Bluebird	" 21	" 3	Mar. 24
Cowbird	" 21	" 8	" 29
Bronzed Grackle	" 23	" 2	" 27
Red-winged Blackbird	" 23	" 2	" 24
Tree Sparrow	" 23	" 9	" 24
Meadowlark	" 23	" 5	Apr. 3
Migrant Shrike	" 25	" 16	Mar. 30
Marsh Hawk	" 25	" 12	Apr. 1
Junco	" 25	" 6	Mar. 23
Golden-eye	" 26	Mar. 29	—
Flicker	" 26	Apr. 16	Apr. 10
Winter Wren	" 26	" 18	" 17
Golden-crowned Kinglet	" 26	" 14	" 8
Killdeer	" 26	" 16	Mar. 28
Tree Swallow	" 26	" 8	Apr. 3
Phoebe	" 26	" 9	" 8

Dates of Arrival.

	1907	1906	1905
Herring Gull	Mar. 30	Apr. 3	Apr. 10
Sparrow Hawk	" 30	" 7	" 18
Savanna Sparrow	" 31	" 15	" 11
Vesper Sparrow	Apr. 1	" 15	" 12
Brown Creeper	" 2	" 15	Mar. 30
Chipping Sparrow	" 3	" 15	Apr. 12
Kingfisher	" 13	" 16	" 8
Hooded Merganser	" 13	" 7	" 17
Wilson's Snipe	" 18	" 20	—
Hermit Thrush	" 18	" 14	Apr. 10
Barn Swallow	" 18	" 21	" 25
Yellow-bellied Sapsucker	" 27	" 15	" 10
Downy Woodpecker	" 27	" 8	" 11
Purple Finch	" 27	Mar. 29	Mar. 1
White-throated Sparrow	" 28	Apr. 15	Apr. 23
Ruby-crowned Kinglet	" 28	May 1	" 27
Myrtle Warbler	" 28	" 2	May 1
Purple Martin	" 26	Apr. 22	Apr. 23
Whippoorwill	May 5	May 1	—
House Wren	" 9	" 2	Apr. 28
Chimney Swift	" 10	Apr. 30	May 2
Black and White Warbler	" 10	May 4	Apr. 28
White-crowned Sparrow	" 13	" 16	May 16
Yellow Warbler	" 13	" 4	" 1
Blackburnian Warbler	" 13	" 10	" 1
Rose-breasted Grosbeak	" 13	" 13	" 11
Bank Swallow	" 14	" 13	" 18
Redstart	" 14	" 15	" 5
Water-thrush	" 14	" 11	" 8
Kingbird	" 14	" 7	" 5
Baltimore Oriole	" 14	" 13	" 6
Ovenbird	" 14	" 13	" 6
Canadian Warbler	" 15	" 19	" 12
Parula Warbler	" 15	" 7	" 10
Black-throated Blue Warbler	" 15	" 7	" 10
Goldfinch	" 15	Apr. 17	Mar. 13
Least Flycatcher	" 15	May 11	May 5
Nashville Warbler	" 15	" 7	" 7
Magnolia Warbler	" 15	" 16	" 10
Wilson's Thrush	" 15	" 6	" 6
Scarlet Tanager	" 15	" 17	" 14
Wilson's Warbler	" 15	" 21	" 19
Nighthawk	" 16	" 16	" 14

Dates of Arrival.

	1907	1906	1905
Warbling Vireo	May 16	May 6	May 10
Red-eyed Vireo	" 16	" 15	" 6
Bay-breasted Warbler	" 16	" 16	" 19
Black-throated Green Warbler	" 16	" 7	" 1
Tennessee Warbler	" 16	" 17	" 24
Cape May Warbler	" 16	" 12	" 22
Northern Yellowthroat	" 16	" 11	" 4
Olive-backed Thrush	" 16	" 13	" 16
Catbird	" 17	" 15	" 6
Chestnut-sided Warbler	" 17	" 13	" 7
Bobolink	" 18	" 5	" 2
Crested Flycatcher	" 19	" 11	" 12
Blue-headed Vireo	" 19	" 15	" 7
Cliff Swallow	" 19	" 9	" 17
Rusty Grackle	" 19	" 7	Apr. 10
Spotted Sandpiper	" 19	" 2	May 4
Sora	" 19	" 8	—
Solitary Sandpiper	" 20	" 18	—
Swamp Sparrow	" 20	Apr. 18	May 8
Bittern	" 20	" 16	—
Gray-cheeked Thrush	" 23	—	May 14
Alder Flycatcher	" 24	May 19	" 24
White-breasted Nuthatch	" 24	Apr. 4	Feb. 28
Mourning Warbler	" 29	May 19	May 12
Red-headed Woodpecker	" 29	" 26	
Blackpoll Warbler	" 31	" 21	May 17
Wood Pewee	" 31	" 17	" 4
Hummingbird	" 30	" 15	" 11

Ottawa, Ontario, Aug. 23, 1907.